

Access to improved drinking-water source and improved sanitation in a part of Pune city

Dhrubajyoti J Debnath*, (Col) P.S. Chawla, Samir Singru and
(Air Cmde) Kevin Fernandez

Department of Community Medicine, Smt. Kashibai Navale Medical College, Narhe,
Pune-411041, Maharashtra, India

Abstract: *Objective:* To find the access of urban people to improved drinking-water source and improved sanitation facility in a part of Pune city. *Background:* Access to improved drinking-water source and sanitation facilities has been immensely influencing the health and well being of people. *Method:* This was an observational cross-sectional study. The study population comprised of housewives residing in urban area and attending the outpatient department of Urban Health Training Centre of a Medical College in Pune city. Our study used the definition given by the WHO/UNICEF Joint Monitoring Programme (JMP) for "improved" drinking-water source and "improved" sanitation facility. Data was analysed from 369 households in an urban area of Pune. *Statistical analysis used:* Proportion with confidence interval and chi square test. P value less than 0.05 was considered as statistically significant. *Result and conclusion:* 95.7% of the urban study population had access to improved drinking water source. 54.2% of the urban study population had access to improved sanitation facility. The odds of a *pucca* house with access to improved sanitation were found to be more than 2 times as compared to a *Kutcha* house having access to improved sanitation facility. There is a need for stressing the importance of constructing and using the sanitary latrine. Better utilization of government subsidies and other schemes related to the construction of sanitary latrine are also important to address this issue.

Keywords: Improved Drinking Water Source, Improved Sanitation Facility, Access.

Key Messages: Behavioural change in the people to construct and use improved sanitation facilities for those who can afford. Better utilization of government subsidies and other schemes related to the construction of sanitary latrine for those who do not afford.

Introduction

Diarrhea is the third most common cause of death in under-five children and responsible for 13% deaths. Diarrhea kills an estimated 300,000 children in India each year [1]. The possibility of faecal contamination is maximum in poor urban areas where insufficient water supply and sanitation coverage combine with overcrowded conditions. Globally, each day, nearly 1,000 children die due to preventable water and sanitation-related diarrhoeal diseases. According to United Nations Children's Fund report (UNICEF), poor sanitation, lack of access to clean water, and inadequate personal hygiene are responsible for an estimated 88% of childhood diarrhea in India [2-3].

On 25th September 2015, countries adopted a set of goals to end poverty, protect the planet, and ensure prosperity for all as part of a new

sustainable development agenda. Goal 6 is to 'Ensure access to water and sanitation for all. [3]. International monitoring of drinking water and sanitation has been on-going since the 1930s carried out by the League of Nations Health Organization. Then subsequently International monitoring of drinking water and sanitation was carried out by the World Health Organization (WHO), and then jointly by WHO and The United Nations Children's Fund (UNICEF) through their Joint Monitoring Programme (JMP) [4].

Globally, the number of people having access to improved sources of drinking water increased from 64% in 1970 to 89% in 2012, while the number using basic sanitation increased from 36% to 64%. More than half of the world's population now gets water from a piped source in the home [5]. As per data by

World Bank, 94% of Indian population had access to improved drinking-water source [6] and 40 % of Indian population had access to improved sanitation facilities in 2014 [7]. Improving access to safe water and sanitation facilities leads to healthier families and communities [8]. Life expectancy at birth has increased from 56.5 to 68.7 years [9], which is in part to the improvements in access to drinking water and sanitation. [5,10]. The human right to both water and sanitation was subsequently recognised in 2010 through UN General Assembly and UN Human Rights Council resolutions [11-12].

The MDG target implied a commitment to raise the global drinking water coverage of 77% per cent in 1990 to 88.5% in 2015. In order to halve the proportion of people without improved sanitation, global coverage was required to grow to 75 per cent by 2015, from a starting point of 49 per cent in 1990 [13]. Keeping this in mind a cross-sectional study was designed with the objective to find the access of urban people to improved drinking water source and improved sanitation facility and to study its association with type of housing.

Material and Methods

This was an observational cross-sectional study. The study population comprised of housewives attending the outpatient department (OPD) of Urban Health Training Centre of a Medical College in Pune city. The data collection was done in the year 2012 using a pretested semi structured questionnaire. Informed consent was taken from the study participant before administering the questionnaire. A household was included only once in the study.

Our study used the definition given by the WHO/UNICEF Joint Monitoring Programme (JMP) for "improved" drinking-water source and "improved" sanitation facility. An "improved" drinking-water source is one that, by the nature of its construction and when properly used, adequately protects the source from outside contamination, particularly faecal matter. "Improved" sources of drinking-water included piped water into dwelling, piped water to yard/plot, public tap or standpipe, tubewell or borehole, protected dug well, protected spring, rainwater. Our study used WHO/UNICEF Joint

Monitoring Programme (JMP) definition of access to drinking water as the source which was less than 1 kilometer away from its place of use and that it was possible to reliably obtain at least 20 litres per member of a household per day [13-14].

An "improved" sanitation facility is one that hygienically separates human excreta from human contact. "Improved" sanitation included flush toilet, piped sewer system, septic tank, flush/pour flush to pit latrine, ventilated improved pit latrine (VIP), pit latrine with slab. "Unimproved" sanitation include flush/pour flush to elsewhere, pit latrine without slab, bucket, hanging toilet or hanging latrine, shared sanitation which refers to sanitation facilities although of an improved kind, but shared between two or more households and all public facilities, no facilities or bush or field [14]. For the purpose of study, *pucca* house was defined as a house where floor was made of flat stones or bricks; walls were built of stone or brick and roof was built of tin, asbestos or concrete *Kutch* house was defined as house made of material other than those mentioned above, such as where floor was of earth, walls and/or roof were made of mud, bamboos, grass, thatch etc. In this study, we considered that people living in a *pucca* house have better financial condition as compared to those living in a *kutch* house.

For the purpose of sample size estimation, World Bank, 2011 figure of 37% of population in India having access to improved sanitation and 91% of population in India having access to improved drinking-water source were used [15-16]. Using the above estimates, the sample size was calculated using Open Epi software [17] with absolute precision as 5%, confidence levels as 95%. The calculated sample size was 358 households for access to improved sanitation and 126 households for access to improved drinking-water source respectively. Thus 358 was taken as the sample size for the study. Additional 10% households were included in the study to take care of non-response from the study participants. Thus 394 households were included in the study. However during the study only 369 responded with the complete filling of the questionnaire. Thus

only 369 were included for analysis purpose with response rate of 93.6%. The method of sampling was convenience sampling. Housewives attending the OPD of Urban Training and Health Centre of a Medical College in Pune were consecutively administered the pre-tested questionnaire in the year 2012 till the sample size was achieved. Access was measured as Proportion with confidence interval and test of significance used was chi square test. P value less than 0.05 was considered as statistically significant. The data was analyzed using Open Epi software [18].

Results

Total 369 housewives participated in the study. The mean age of the housewives was 27.3 years with standard deviation of 6.8 years.

Table-1: Access to Improved drinking-water source (n=369)

Access to improved drinking-water source	Number	percentage
Present	353	95.7
Absent	16	4.3
Total	369	100

Table-2: Access to Improved sanitation (n=369)

Access to improved sanitation	Number	percentage
Present	200	54.2
Absent	169	45.8
Total	369	100

Table-3: Type of house and Improved drinking-water source (n=369)

Type of house	Improved drinking-water source		Total
	Yes	No	
<i>Pucca</i>	234 (95.5%)	11 (4.5%)	245(100%)
<i>Kutchcha</i>	119 (96%)	5 (4%)	124 (100%)
Total	353 (95.7%)	16 (4.3%)	369 (100%)

Odds ratio = 0.89 (95% Confidence Limits Lower 0.30, Upper 2.63)
 Chi square with Yates correction = 0.0045, df =1, p=0.95

Table-4: Type of house and improved sanitation (n=369)

Type of house	Improved sanitation		Total
	Yes	No	
<i>Pucca</i>	147 (60%)	98 (40%)	245 (100%)
<i>Kutchcha</i>	53 (42.7%)	71 (57.3%)	124 (100%)
Total	200 (54.2%)	169 (45.8%)	369 (100%)

Odds ratio = 2.0094 (95% Confidence Limits Lower 1.29, Upper 3.11)
 Chi square with Yates correction = 9.19, df =1, p=0.002

Discussion

In the present study 95.7% of our study subjects had access to improved drinking water source. Our findings are comparable with other surveys of World Bank which found 92% of the population had access to improved drinking-water source in India [15]. Thus less than 5% people living in any type of houses did not have access to improved drinking-water source which shows that economical condition of a household did not appear to be associated with access of improved drinking-water source. This is an encouraging finding as there was hardly any difference between pucca and kutchcha house having access to improved drinking-water source. Globally, in 2011, 768 million people globally relied on unimproved drinking-water sources [19]. The world has met the MDG target of halving the proportion of people without access to improved sources of water, five years ahead of schedule. Between 1990 and 2015, 2.6 billion people gained access to improved drinking water sources [20]. Recent figures also show that in India, 94% of the population had access to improved drinking-water source in the year 2015 [15].

In the present study 54.2% of our study subjects had access to improved sanitation. The findings are comparable with World Bank figures of 38% of the population having access to improved sanitation in the year 2012 [16]. In 2011, almost two thirds (64%) of the world, relied on improved sanitation

facilities. The state of sanitation is a powerful indicator of the human development in any community. Access to sanitation has benefits at many levels. Cross-country studies have shown that the method of disposing of excreta is one of the strongest determinants of child survival. The overall child mortality is reduced by about a third due to transition from unimproved to improved sanitation. Improved sanitation also brings advantages for livelihoods, public health, and dignity- these advantages extend beyond households to entire communities' [21]. Recent figures show that in India, 40% of the population had access to improved sanitation in the year 2015 [16].

However *pucca* houses had more access to improved sanitation as compared to *Kutcha* house and this was statistically significant. The odds of a *pucca* house with access to improved sanitation were found to be more than 2 times as compared to a *Kutcha* house with access to improved sanitation. The width of 95% confidence interval is small thus estimating a higher level of precision of odds ratio in the present study. Good economic condition of a household may be one of the determinant for having access to improved sanitation because *pucca* houses were found to have more access to improved sanitation.

The global MDG target for sanitation has been missed by almost 700 million people. In 2015, 2.4 billion people still lack improved sanitation facilities. The least developed countries did not meet the sanitation target, and only 27 per cent of their current population has gained access to improved sanitation since 1990 [22]. Unimproved drinking water and sanitation are responsible for an estimated 1% of global disability-adjusted life years (DALYs) [23]. 85% of diarrhoea mortality can be attributed to inadequate water, sanitation, and hygiene practices (WaSH) [24].

However, people who lived in *pucca* houses had 17% more access to improved sanitation as

compared to people who lived in *Kutcha* houses. The odds of a *pucca* house with access to improved sanitation were more than 2 times as compared to a *Kutcha* house with access to improved sanitation and this was statistically significant. This showed that better financial condition of a household appeared to be an important determinant associated with access to improved sanitation. However it was also found that 40% of our urban study population staying in a *pucca* house still lacked access to improved sanitation. These are the households who definitely can afford improved sanitation.

The reasons for non use probably could be not appreciating the health importance for the construction and use of improved sanitation. Thus in our study, in addition to better financial condition of a household, the desire of the people to get access to improved sanitation appears to be another important factor as far as access to improved sanitation is concerned. Behavioural change communication sessions for such people to construct and use improved sanitation facilities is of utmost importance. This may help us to achieve the goals for access to improved sanitation facility within a time frame set up by the world leaders.

Limitations of the study: We could not include households from all the wards of the urban area since the questionnaire was administered to people coming to the OPD of the Urban Health and Training Centre. Method of water storage in the households was not studied because of the same reason.

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*All correspondences to: Dr. Dhruvajyoti J. Debnath, Associate Professor, Department of Community Medicine, Smt. Kashibai Navale Medical College, Narhe, Pune-411041, Maharashtra, India. E-mail: drdhrub2011@gmail.com